Claims:

The listing of pending claims is as follows:

1. (Previously Presented) A method for controlling exposure energy on a patterned wafer substrate, comprising the steps of:

controlling the exposure energy with a feedback process control signal of critical dimension,

and further controlling the exposure energy with a feed forward process control signal of a compensation amount that compensates for thickness variations in a subjacent layer beneath a top layer, by combining the feed forward process control signal with the feedback process control signal to control the exposure energy used in patterning the top layer,

the critical dimension being one of a width, a spacing and an opening of the patterned wafer substrate and the top layer being a non-photoresist layer.

2. (Cancelled)

3. (Original) The method of claim 1, further comprising the step of: supplying the feed forward process control signal by a feed forward controller.

4. (Previously Presented) The method of claim 1, wherein the subjacent layer comprises an interlayer.

5. (Previously Presented) The method of claim 4, wherein the step of controlling the exposure energy by a feed forward process control signal utilizes a signal of measurement of thickness remaining of the interlayer after chemical mechanical planarization thereof.

6. (Original) The method of claim 1, further comprising the step of: calculating the compensation amount according to a polynomial function with a coefficient of the

function being based on a measurement of a remaining thickness of a planarized interlayer.

7. (Previously Presented) The method of claim 1, further comprising the step of: calculating the feedback process control signal of critical dimension measurement of a top layer in a previous manufacturing lot.

8. (Previously Presented) The method of claim 1, further comprising the steps of: calculating the compensation amount according to a polynomial function with a coefficient of the function being based on a measurement of a remaining thickness of the subjacent layer; and calculating the feedback process control signal of critical dimension measurement of a top layer in a previous manufacturing lot, the subjacent layer being a planarized interlayer.

9. (Previously Presented) The method of claim 1, further comprising the step of: calculating the compensation amount according to a polynomial function with higher order coefficients set at zero.

10. (Previously Presented) The method of claim 1, further comprising the step of: calculating the compensation amount according to a linear function.

11. (Previously Presented) The method of claim 1, further comprising the step of: calculating the compensation amount according to a segmented linear function.

12. (Previously Presented) A system for controlling exposure energy on a first patterned wafer substrate, comprising:

a feed forward controller providing a feed forward control signal to an exposure apparatus based on a thickness measurement of an interlayer of the first patterned wafer substrate for controlling the exposure energy focused on a top layer of the first patterned wafer substrate, and

a feedback controller providing a feedback exposure energy control signal to the exposure apparatus based on critical dimension measurement of a top layer of a second patterned wafer substrate of a previous manufacturing lot, the critical dimension being one of a width, a spacing and an opening of the second patterned wafer substrate,

wherein a combiner combines the feed forward control signal and the feedback exposure energy control signal to produce a combined signal that is provided to the exposure apparatus, the top layer being a non-photoresist layer.

13. (Original) The system of claim 12, further comprising: a thickness measurement device providing thickness measurement data to the feed forward controller.

14. (Previously Presented) The system of claim 12, further comprising: a critical dimension measurement device providing critical dimension measurement data to the feedback controller.

15. (Previously Presented) The system of claim 12, further comprising:

a thickness measurement device providing thickness measurement data to the feed forward controller and

a critical dimension measurement device providing critical dimension measurement data to the feedback controller.

16. (Previously Presented) The system of claim 12, further comprising: a thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the first patterned wafer substrate to the feed forward controller.

17. (Previously Presented) The system of claim 12, further comprising: a critical dimension measurement device providing critical dimension measurement data of a poly-gate of wafer substrate of a previous manufacturing lot.

18. (Previously Presented) The system of claim 12, further comprising:

a thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the first patterned wafer substrate to the feed forward controller, and

a critical dimension measurement device providing critical dimension measurement data of a poly-gate of a previous manufacturing lot.

19. (Previously Presented) The system of claim 18 wherein,

the feed forward controller is user configurable by having one or more polynomial coefficients set to zero in a polynomial function model.

20. (Original) The system of claim 12 wherein;

the feed forward controller is user configurable by having one or more polynomial coefficients set to zero in a polynomial function model.

21. (Previously Presented) The system of claim 20, further comprising: a thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the first patterned wafer substrate to the feed forward controller.

22. (Previously Presented) The system of claim 20, further comprising: a critical dimension measurement device providing critical dimension measurement data of a poly-gate of the second patterned wafer substrates of a previous manufacturing lot.